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THE CLASSIFICATION OF THE EARED SEALS.—In the review of my paper on the “Eared Seals”* by Dr. Theodore Gill, published in the January number of the NATURALIST,† I was pleased to see that this accomplished zoologist found in it a few things to commend, nor was I surprised to find, knowing his opinions previously, that on a few points we still somewhat differ. I regretted to observe, however, that notwithstanding his accustomed accuracy, Dr. Gill had, in the present article, fallen into several by no means unimportant errors. He quite severely criticises my provisional differentiation of the *Otariadæ* into two subfamily groups, and in so doing has not only questioned the value ascribed by me to the characters alleged to be distinctive of the two groups, but also the *existence of such distinctions*, at least to anything like the extent claimed for them.

The distinctions given as characteristic of the two groups were differences in the character of the pelage, in size, form, the relative length of the ear and the swimming membranes or toe-flaps. Without discussing here the taxonomic value of these distinctions, I propose to examine briefly whether any of them have been shown by Dr. Gill “to be degraded to absolute nullity.”

First, in regard to the pelage. The *Oulophocinæ* were characterized as having “thick under fur,” and the *Trichophocinæ* as being “without under fur.” As showing that this character is not a trenchant one, Dr. Gill cites the observation of Dr. Peters that the *Arctocephalus antarcticus* (*Otaria pusilla* Peters) has very thin under fur, and the remark of Dr. Gray that in *Zalophus lobatus* (*Z. cinereus* Gill) the young are “covered with soft fur which falls off when the next coat of fur is developed,” both of which objections I had already noticed.‡ To go over the ground again, however, I may state that since Dr. Peters wrote, it has been ascertained that both the *Arctocephalus antarcticus* and the *A. cinereus* are richly provided with under fur, so well so, at least, that these animals are pursued for their fur, which forms an article of high commercial value.§ The remark respecting the tem-

* Bulletin of the Museum of Comparative Zoology, Vol. II, pp. 1-108, 1870.

† Vol. IV, pp. 675-684.

‡ Bull. Mus. Comp. Zool., Vol. II, p. 41.

§ Ann. and Mag. Nat. Hist., 4th ser., Vol. I, p. 219, March, 1868. Dr. Gray describes the *A. cinereus* as having the “under fur abundant” (Ann. and Mag. Nat. Hist., 3d ser., Vol. XVIII, p. 236, 1868), which remark is confirmed by a young specimen of this animal in the Museum of Comparative Zoology.

porary under fur possessed by the young of *Zalophus lobatus* was made nearly half a century ago, and though often quoted since, has never yet been confirmed, so far at least as I have been able to ascertain. Since such a fact, however, would be contrary to analogy, to say the least, the accuracy of this observation seems to require confirmation. While in the hair seals the homologue of the under fur of the fur seals *may* be considered to exist in the short, stiff, crisp under hairs, — which are so few as only to be discovered by the most careful search, at least in old males of *Eumetopias*, and apparently also in *Otaria* and *Zalophus*, — they do not accord at all in their nature with the fine, soft, abundant, silky under fur of the fur seals. The under fur of the fur seals is known to vary more or less in amount with the season, which variations may have given rise to the observations of Dr. Peters cited by Dr. Gill.

In regard to size, the hair seals were characterized as “large,” and the fur seals as “smaller.” As the representatives of *Otaria* and *Eumetopias* are several times larger, in respect to bulk, than any of the representatives of either *Callorhinus* or *Arctocephalus*, and the representatives of *Zalophus* are considerably larger than any of the fur seals, I fail to see that the difference in size “seems to be more than reduced to a minimum and to be degraded to absolute nullity.”

In regard to form, the fur seals were described by me as being “more slender” than the hair seals. This observation was based upon a comparison of the skeletons of two of the leading genera — *Eumetopias* and *Callorhinus* — and the figures and descriptions of the other species. Not only are all the bones smaller in comparison to their length in *Callorhinus* than in *Eumetopias*, but the limbs are also slenderer and longer in proportion to the size of the body. In the comparison Dr. Gill has attempted to make, in his review, of the form of *Eumetopias* with that of *Callorhinus*, in order to determine whether there was any difference in form in the two groups, a singularly improper basis was adopted, namely, the “ratio of the skull to the length of the male skin.” His rather obscure comparative table serves only to represent the individual variation in the specimens of the same species, as exaggerated in stuffed specimens. Had he computed the ratio the length of the skull bears to that of the whole skeleton, data equally at his command, instead of between the skulls and skins, his table

would have had some value as showing the variation in respect to this ratio that obtains between specimens of the same species. But the idea of determining the relative slenderness of two animals by the number of times the length of the head is contained in the total length of the body, is, to say the least, a novel one to me, since slenderness and robustness of form usually involve, as is well known, the head as well as the trunk, as a little reflection will doubtless at once convince my reviewer. That the expression “‘form more slender’ of the former [*Oulophocinæ*] implies a greater relative total length for these animals *than the head alone would indicate*,” is an announcement for which I was quite unprepared.

In regard to the length of the ear in the two groups, it appears that Dr. Gill has also been unfortunate in his generalizations. According to his quoted measurements, the ear in the longest-eared species of the hair seals (*Eumetopias*) scarcely equals that of the shortest-eared species of the fur seals, but he seems to have forgotten that the bulk of *Eumetopias* is several times that of the largest of the fur seals, so that while the ear is absolutely but little longer in the fur seals than in the longest-eared hair seals, it is relatively very much longer.

Having said this much in regard to the validity of the characters I gave as distinctive of these two groups, I desire to add a word in respect to the matter of “conservatism.” Dr. Gill says, “In the case of doubtful species — at least of those which have *tangible characters*, but the value of which may be dubious — some naturalists refer such at once to species which they appear in their judgment to most resemble, while others — probably most — retain them with reserve, awaiting future information. Of the former school, Mr. Allen is an ardent disciple, and finding a certain range of variation in some known form, he concludes that analogous variations are only of like value.” In reply to this, I will only say that my practice is to never reduce to a synonyme any species presenting “tangible characters,” or even those which appear to have such characters, or where the probability seems to be that it may be distinct, though not as yet properly characterized. When no evidence of the validity of a given species has been advanced, which in the light of present facts can be so considered, I deem it subservient to the interests of science to refer them to the species to which they seem evidently to belong; as in no

other way will their true character be more likely to be eventually made evident; for those authors who have recognized them as valid will be likely to reinvestigate the subject before submitting to their being dropped from our systems. All zoologists, I think, will admit that the tendency is to a multiplication of nominal species; and all likewise know how difficult it is to eradicate a nominal species from our systems. Probably few naturalists now doubt that many currently received species rest solely on characters of individual variation, and it seems to me unwise to retain such species as are unquestionably of this character in the hope that through some fortunate circumstance they may be some day proved valid. It seems to me impossible, in fact, that any one who has compared a large number of specimens of any well known species with each other, can resist the conviction that, as the number of specimens in our museums increases, the number of species will be greatly reduced, notwithstanding that in the mean time not a few really new ones may be discovered. I have myself found that the more common species of both the birds and mammals of eastern North America—of which I have examined, in many instances, hundreds of specimens of each—vary in size, and even in proportions, in specimens from the same locality and of the same sex, from twelve to twenty per cent. of their average size and form for that locality, and to a corresponding extent in color. Add to this the normal range of the geographical variation each species exhibits, which ordinarily fully equals that of the individual variation,* and it becomes at once evident that with the custom of zoologists to describe species from a single specimen, and often an imperfect one, and their usual want of familiarity with the extent of variation within specific limits in the common species of their own country, the liabilities to an undue multiplication of species have been, and still are, very great. This to many may be a matter of small moment, but to the philosophical zoologist, who desires to carefully investigate the varied phenomena of animal life, it is one of high importance.

Having said thus much in reply to the strictures of Dr. Gill, I now reluctantly turn critic, and pass in review the classification of

*See on this subject a paper in the *Bulletin of the Museum of Comparative Zoology* (Vol. II, pp. 186-250) entitled, "On the Individual and Geographical Variation among Birds, considered in Respect to its Bearing upon the Value of Certain Assumed Specific Characters."

the eared seals proposed by this author in his above-cited paper. While still agreeing with him in regard to the comparatively wide separation of *Zalophus* from its nearest allies, and in regard to its being intermediate between the fur and other hair seals in respect to size, but only in this point, I am compelled to still differ with him in respect to its constituting a primary group coördinate with that of all the other eared seals.* Whilst a somewhat aberrant form, it seems to me to be by no means very far removed from *Eumetopias* and *Otaria*. I can, in fact, scarcely comprehend how it has happened that the author in question has overlooked the presence of a well developed sagittal crest in all the genera of the *Otariadæ* except *Zalophus*, as he seems to have done in the differentiation of his two primary groups of this family. The supposition that he has examined only the skulls of females or young males of the other genera is hardly sufficient to explain this oversight, since figures indicating its presence in the males of the other genera have been long published, to say nothing of the many distinct allusions to it by authors. While familiar with the distinctive characters of *Zalophus*, he has failed to indicate them in his diagnoses, the comparatively unimportant character furnished by the rostral outline being far less characteristic than its slender elongated muzzle and other features, which had previously been well pointed out by Dr. Gill, as well as by other writers. The sagittal crest reaches, it is true, its maximum development in *Zalophus*; but any one who has seen the high sagittal crest possessed by old males of *Eumetopias Stelleri*, in which as a thin solid plate it attains the height of 38 mm., or an inch and a half; and the relatively scarcely less developed sagittal crest in old males of *Callorhinus ursinus*; and the figure of old male skulls of *Otaria jubata*, and some of the species of *Arctocephalus*, in which a high sagittal crest is represented; cannot but be surprised to find in what is assumed to be an enumeration of "the most obvious and distinctive characters" of the genera *Callorhinus*, *Arctocephalus*, *Otaria* and *Eumetopias*, a diagnosis contrasting "a sagittal groove from which are reflected the low ridges indicating the limits of the temporal muscles" in these genera, with "a solid, thin, and much elevated sagittal crest" in *Zalophus*! The females of *Callorhinus ursinus* and *Otaria jubata*, and, so far as at present known, of all

* See American Naturalist, Vol. IV, p. 681.

the eared seals, have the "sagittal groove," etc., as above described, as do also the males till they have attained nearly their full size. The sagittal crest in the males of *Eumetopias* and *Callorhinus* rises at first as a double ridge on each side of the sagittal suture, beginning at the hinder part of the skull. It develops most rapidly in its posterior part, and gradually extends anteriorly to a point opposite the orbital processes. Gradually the laminae of this double plate become soldered into one, uniting first posteriorly, while anteriorly the crest remains composed of two closely applied thin plates, which, in old age, become firmly united the whole length. The sagittal crest in old male skulls of *Zalophus* hence differs from the corresponding crest in *Eumetopias* and *Callorhinus*, only in being relatively somewhat higher, and in being more produced anteriorly. I am not sure, however, that in very aged animals even this slight difference would be constant. In one of the skulls of *Zalophus* I have seen, the two plates were not entirely soldered at their anterior end, thus indicating their development primarily as a double plate, as in *Eumetopias* and *Callorhinus*. The only other character given as separating these two groups—that of the rostral profile—I deem too trivial to require more than the incidental remark already given to it.

In concluding, I may add that the deservedly high standing of my critic as a naturalist seemed to demand from me, in justice to myself, some notice of his sweeping criticisms, especially since not merely the assumed value of the characters given by me as distinguishing what I considered to be two primary groups of the *Otariadæ* were questioned, but also even the existence of such distinctions; but more especially it was due to the interests of science that his incorrect diagnosis of one of the two groups he considers as the two primary groups of this family, should not pass unnoticed, since on this error was based a new classification of the *Otariadæ*. Having done this, the writer will here let the subject rest.—J. A. A.

THE EARLY STAGES OF ICHNEUMON PARASITES.*—These embryological studies were made by Prof. Ganin on the eggs of *Platygastr*, *Polynema*, *Teleas* and *Ophioneurus*, which are minute

*Beiträge zur Erkenntniss der Entwicklungsgeschichte bei den Insecten. Von M. Ganin, aus Charkow. Siebold and Kölliker's Zeitschrift. 1869, pp. 381-451, with 4 plates. Leipzig.